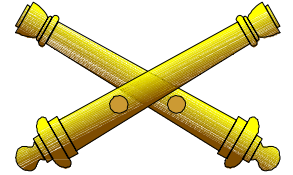
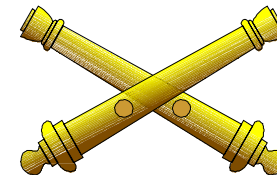


GUNNERY DEPARTMENT

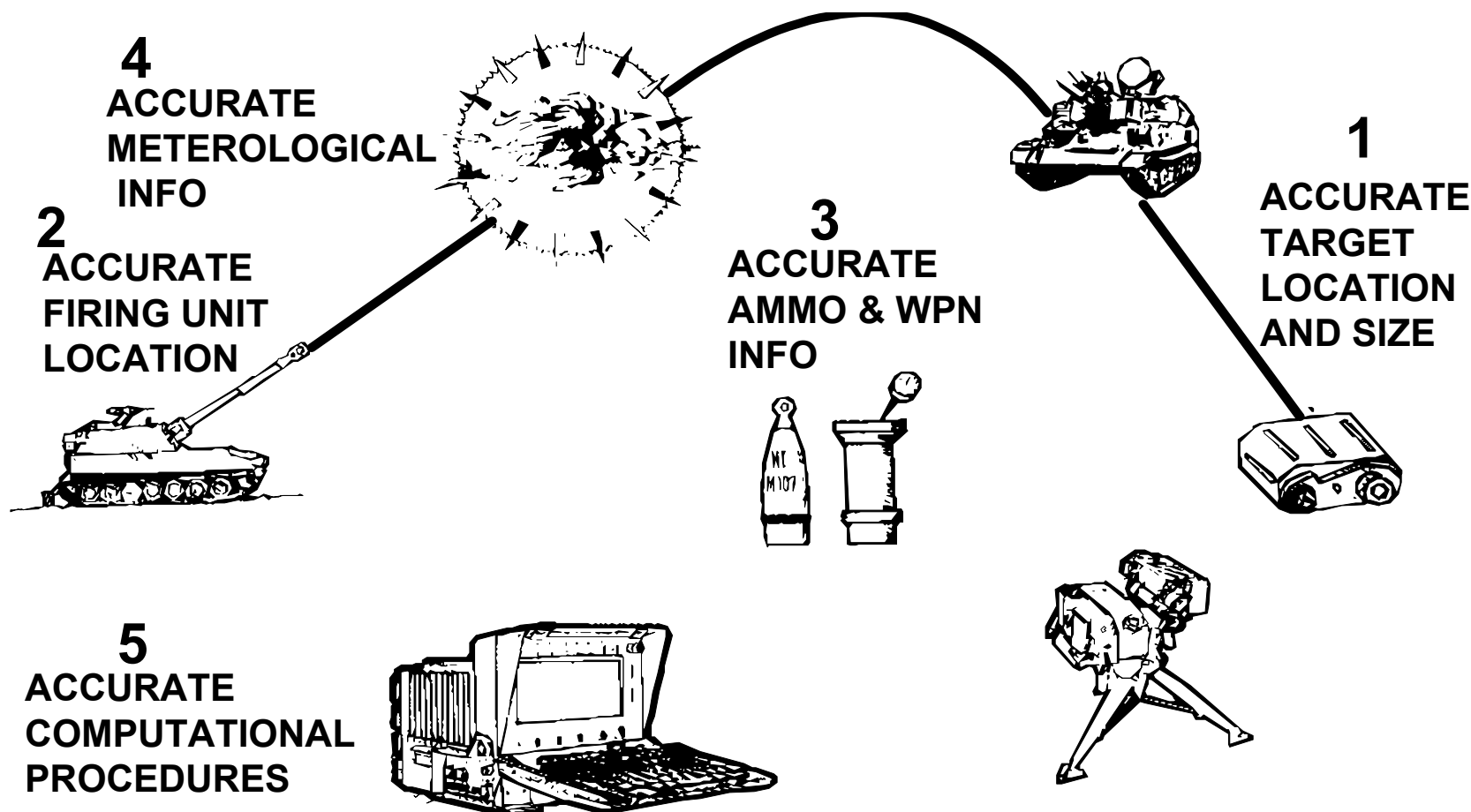


THE KING OF BATTLE

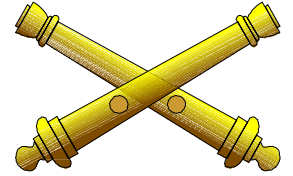
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FIVE REQUIREMENTS FOR ACCURATE PREDICTED FIRE



GUNNERY DEPARTMENT

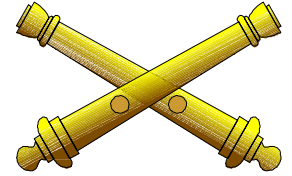


GUNNERY

**THE PRACTICAL APPLICATION OF
BALLISTICS SO THAT THE
DESIRED EFFECTS ARE
OBTAINED BY FIRE**

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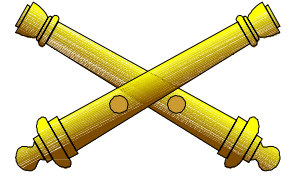
GUNNERY DEPARTMENT



BALLISTICS

**THE SCIENCE WHICH DEALS WITH THE
MOTION OF PROJECTILES AND THE
CONDITIONS WHICH AFFECT THAT
MOTION**

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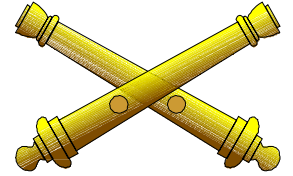
ARTILLERY BALLISTICS

INTERIOR BALLISTICS

TRANSITIONAL BALLISTICS

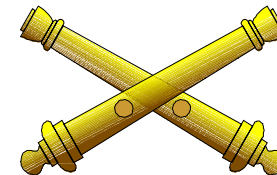
EXTERIOR BALLISTICS

TERMINAL BALLISTICS

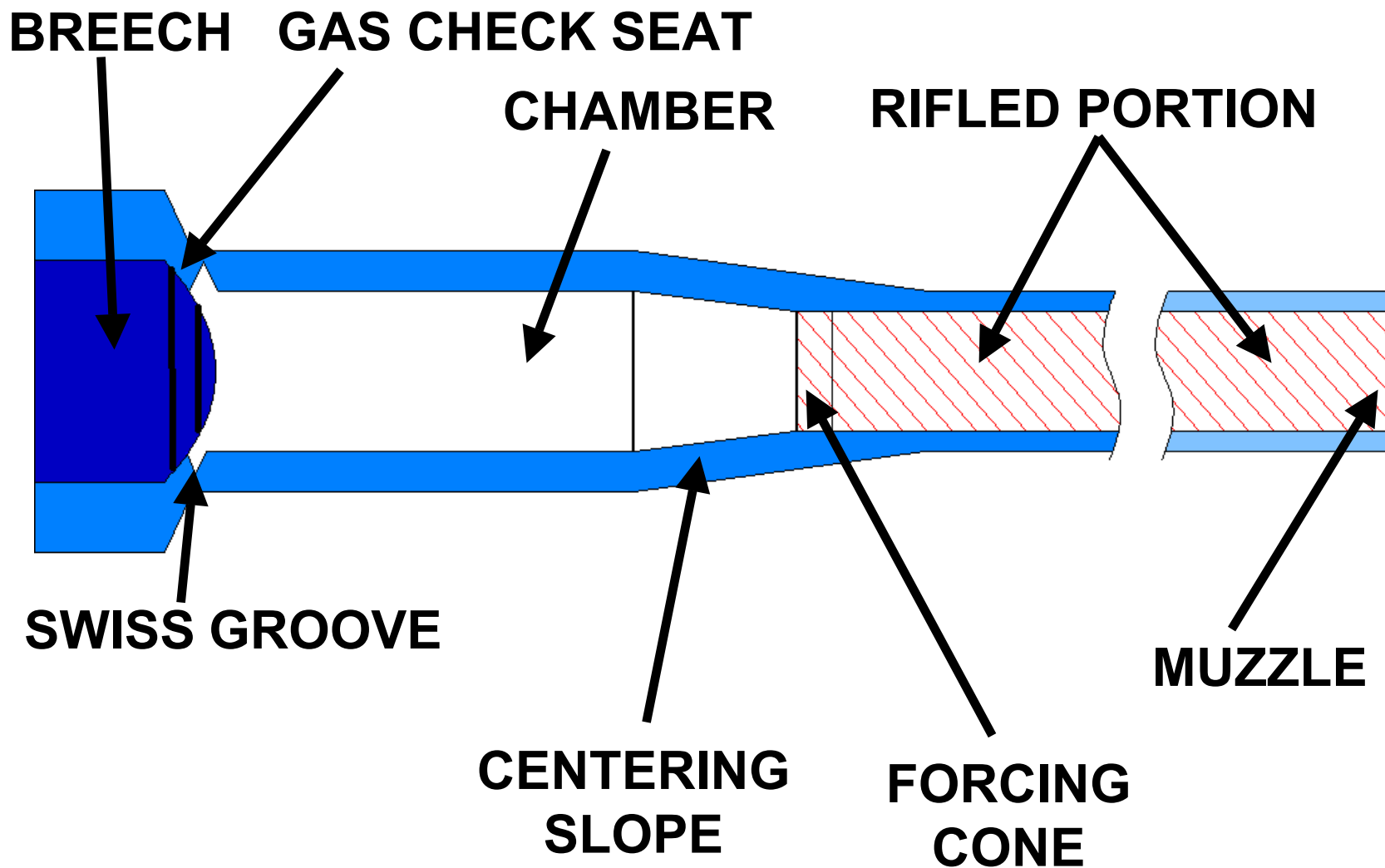


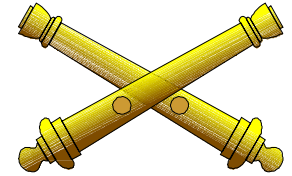
INTERIOR BALLISTICS

**THE SCIENCE THAT DEALS WITH
THE FACTORS AFFECTING THE
MOTION OF THE PROJECTILE
WITHIN THE TUBE**



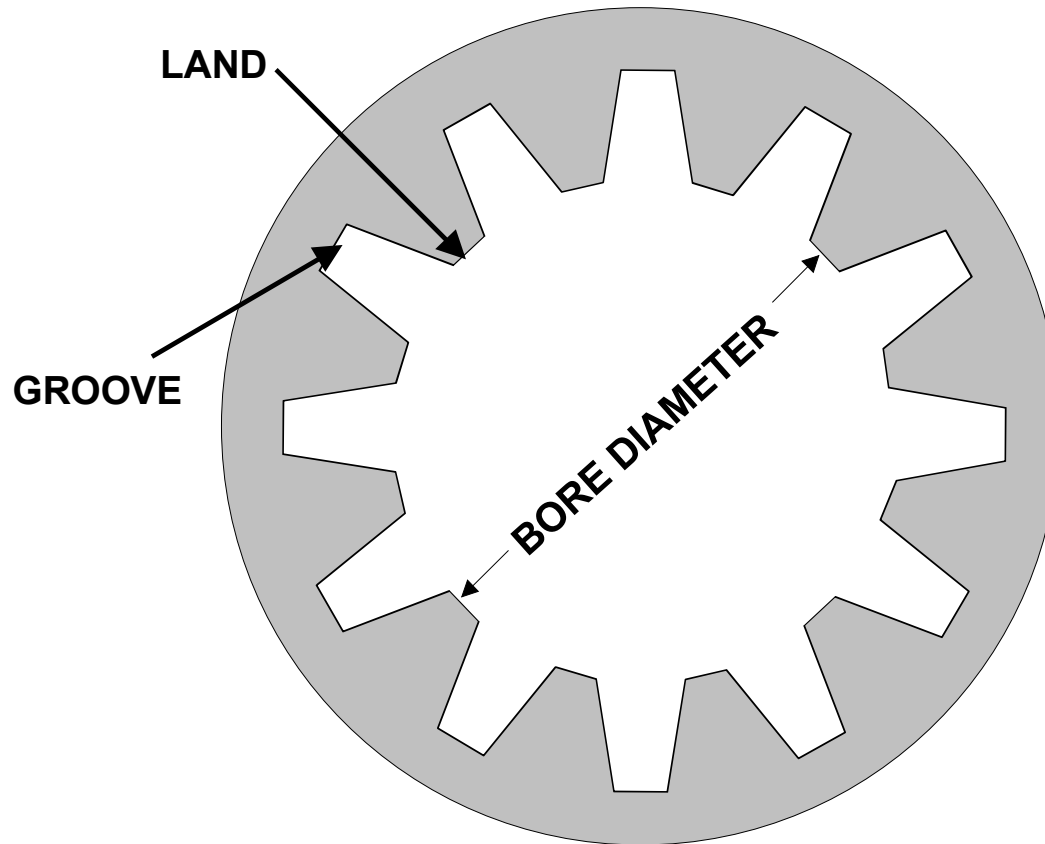
TUBE



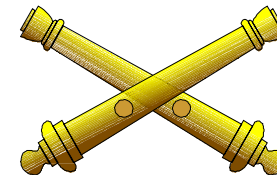


RIFLING

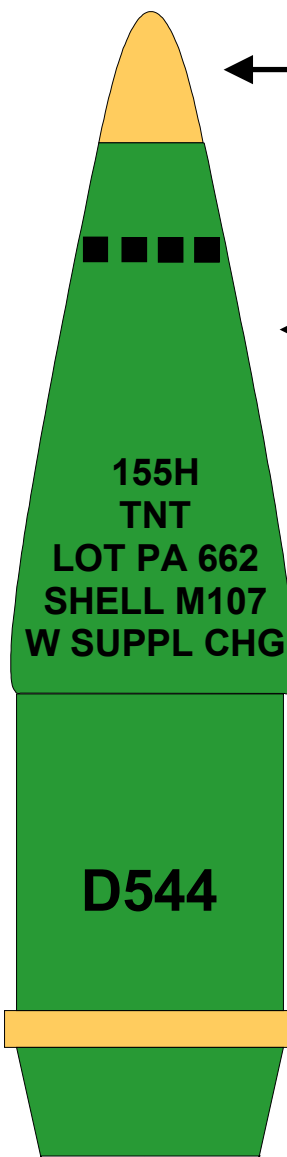
CROSS SECTION OF TUBE



GUNNERY DEPARTMENT



EXTERIOR PARTS OF PROJECTILE



FUZE

OGIVE

BOURRELET

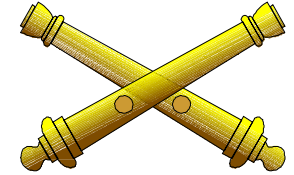
BODY

ROTATING BAND
(or OBTURATING BAND)

BASE

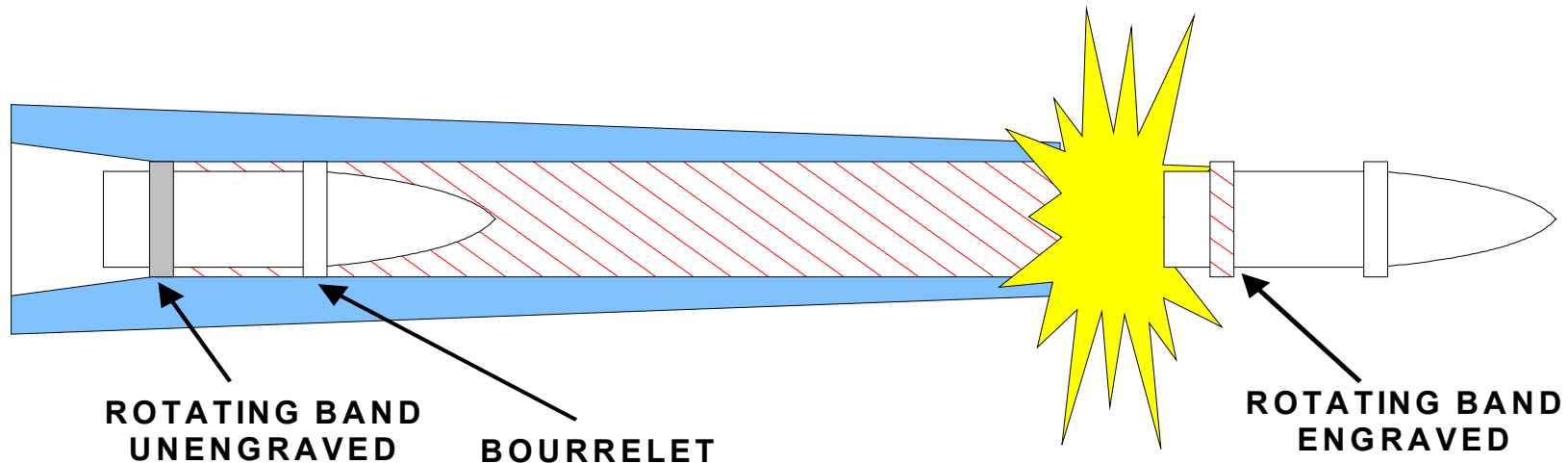
BASE COVER

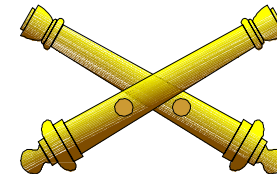
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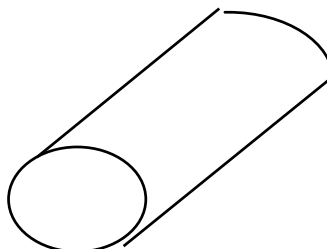
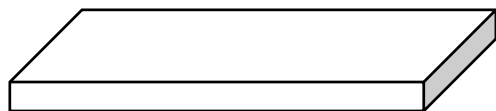
ROTATING BAND

- **HOLDS PROJECTILE THROUGH ALL ANGLES OF ELEVATION**
- **CENTERS PROJECTILE (IN CONJUNCTION WITH BOURRELET)**
- **PROVIDES FORWARD OBTURATION**
- **OFFERS INITIAL RESISTANCE**
- **IMPARTS SPIN**

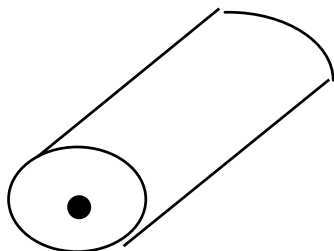




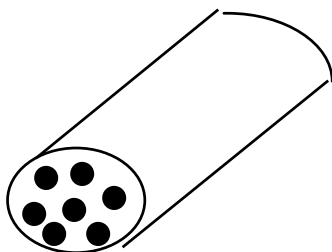
POWDER GRAIN FORMS



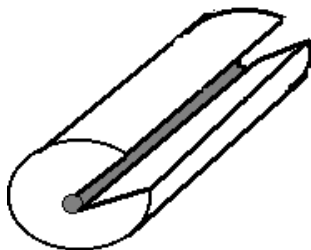
STRIP/CORD



SINGLE PERFORATED

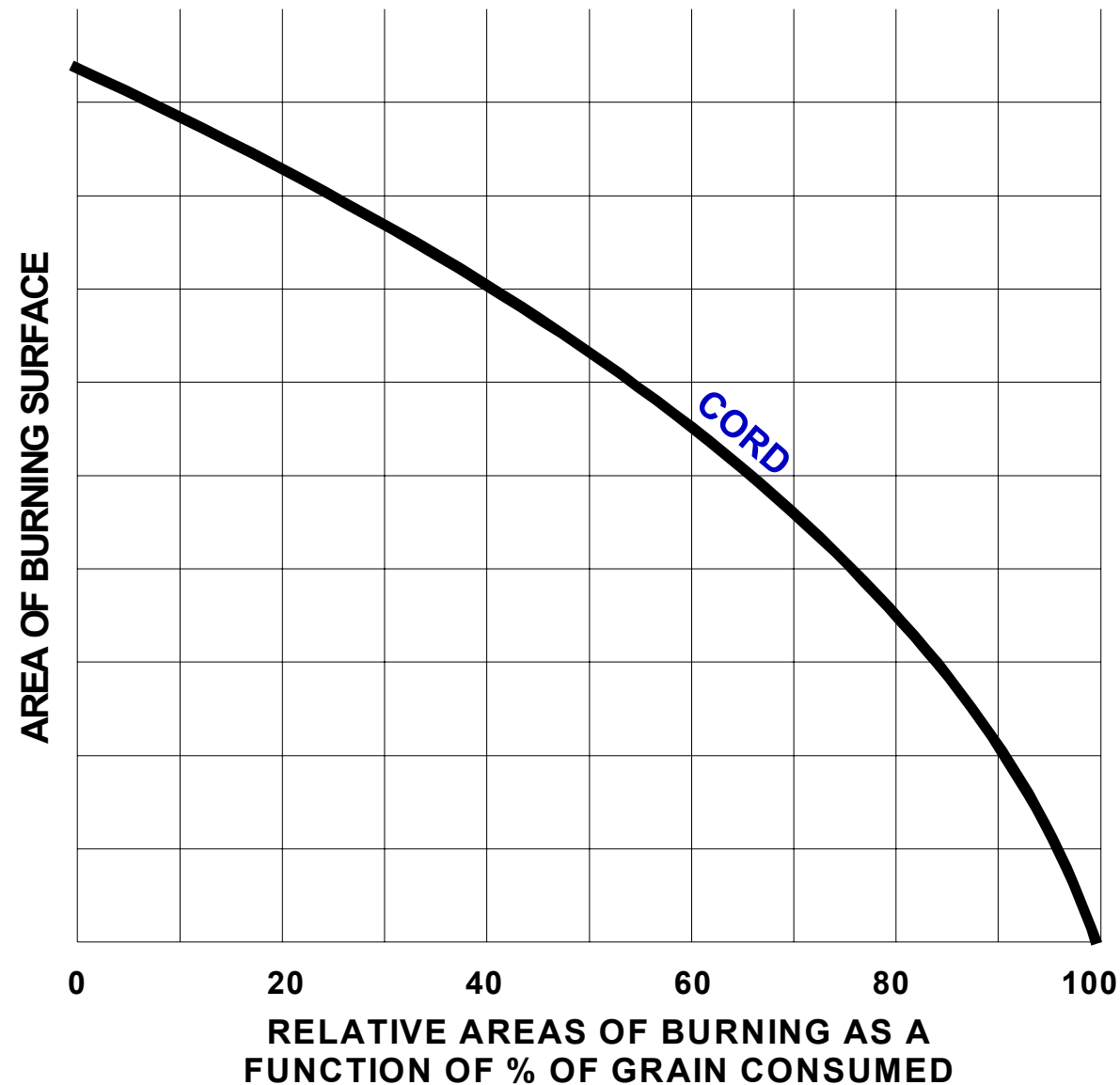
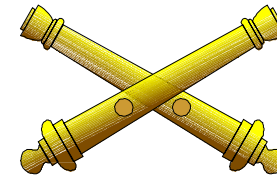


MULTI PERFORATED



SLOTTED STICK

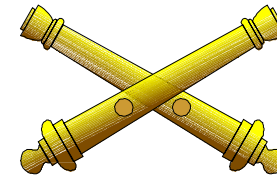
GUNNERY DEPARTMENT



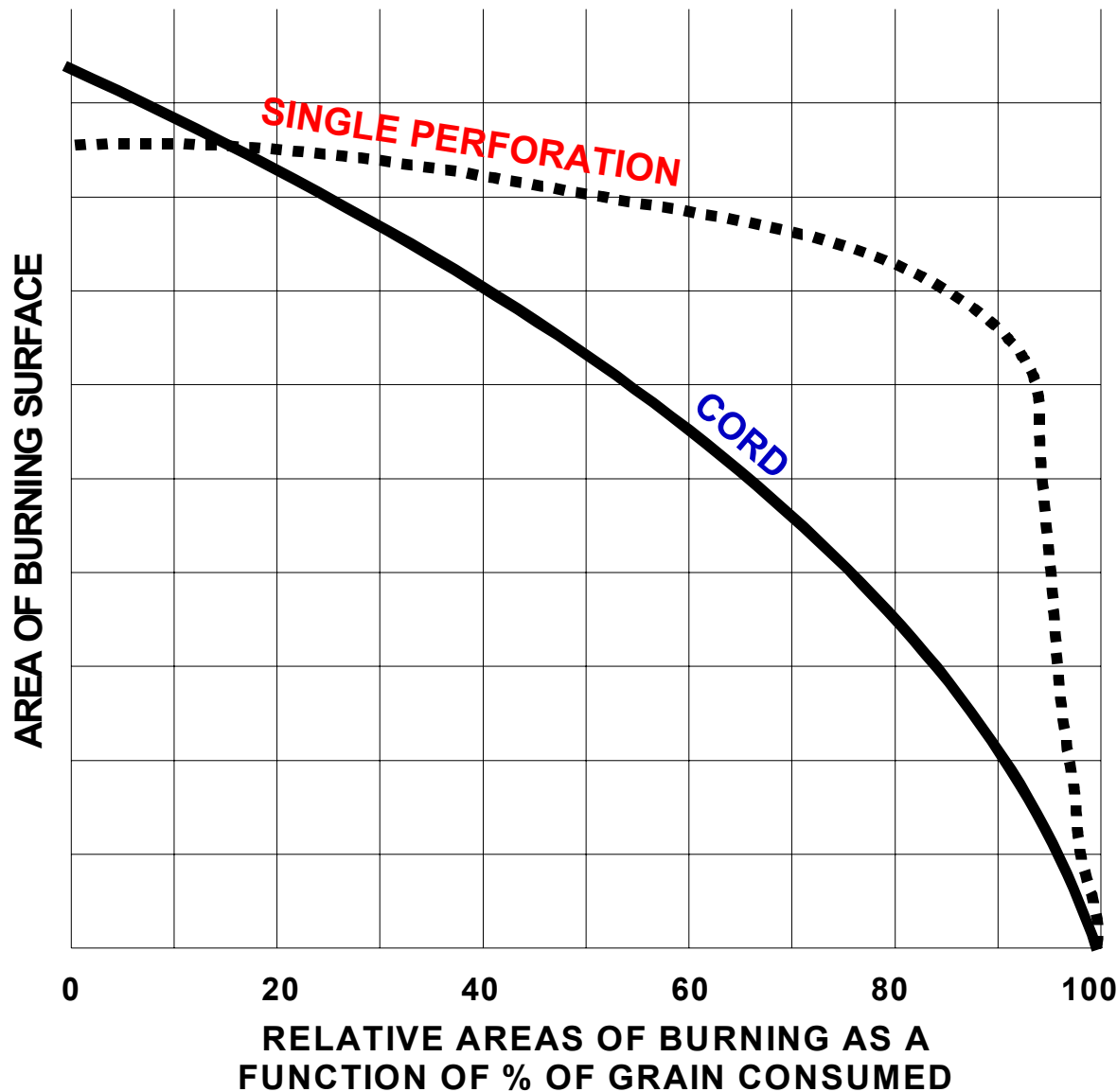
BURN RATES
DEGRESSIVE

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GUNNERY DEPARTMENT



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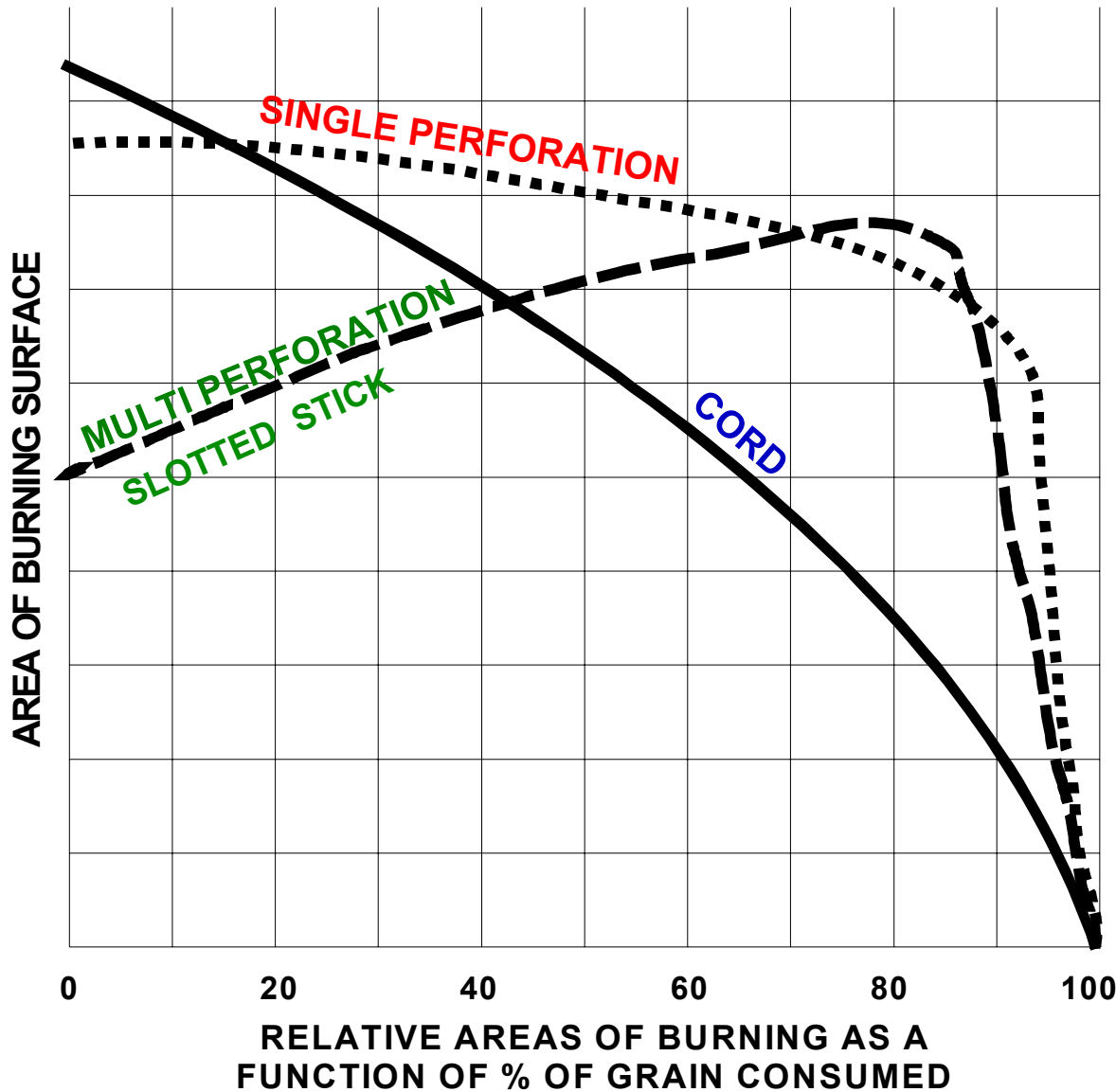
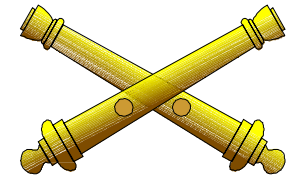


BURN RATES

DEGRESSIVE

NEUTRAL

GUNNERY DEPARTMENT



BURN RATES

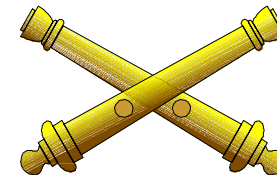
DEGRESSIVE

NEUTRAL

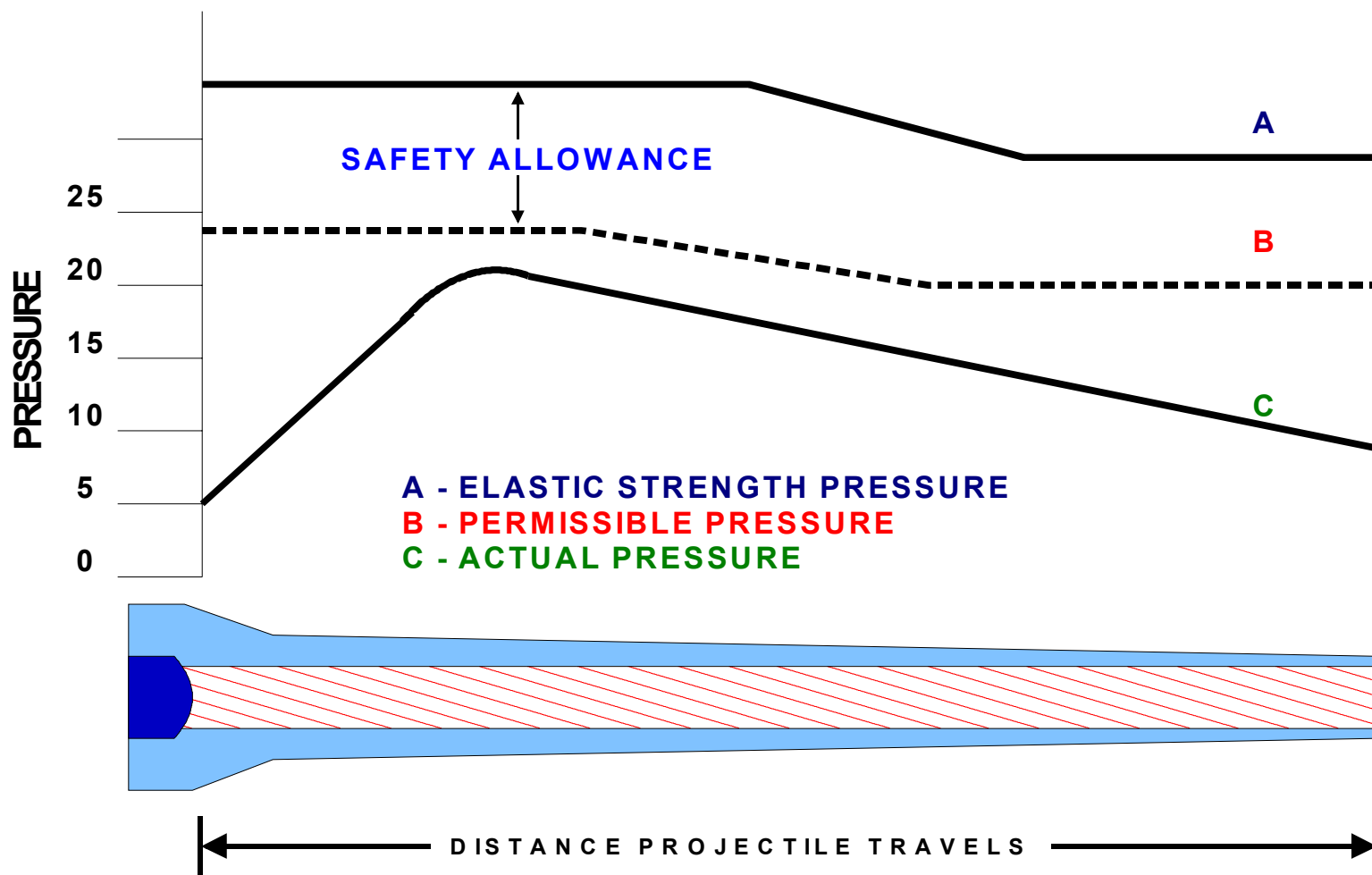
PROGRESSIVE

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GUNNERY DEPARTMENT

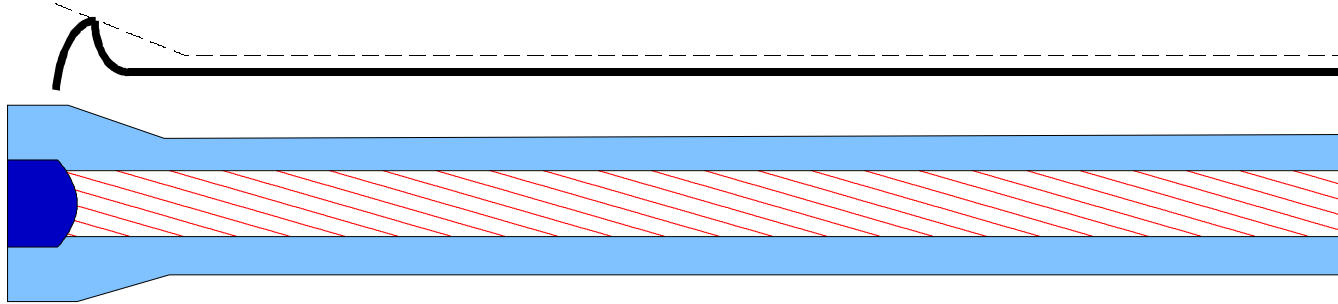
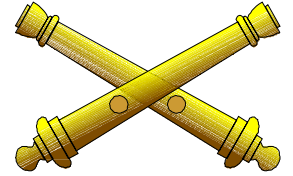


EXAMPLE OF A PRESSURE TRAVEL CURVE



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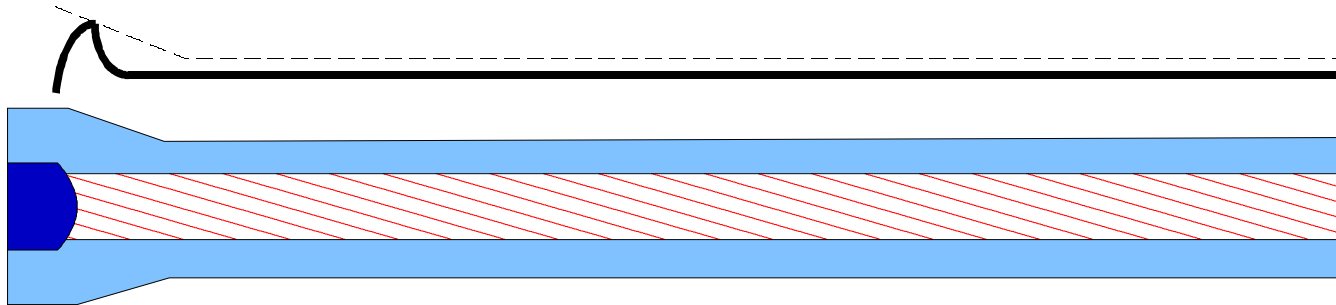
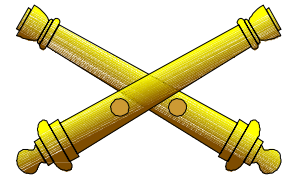
GUNNERY DEPARTMENT



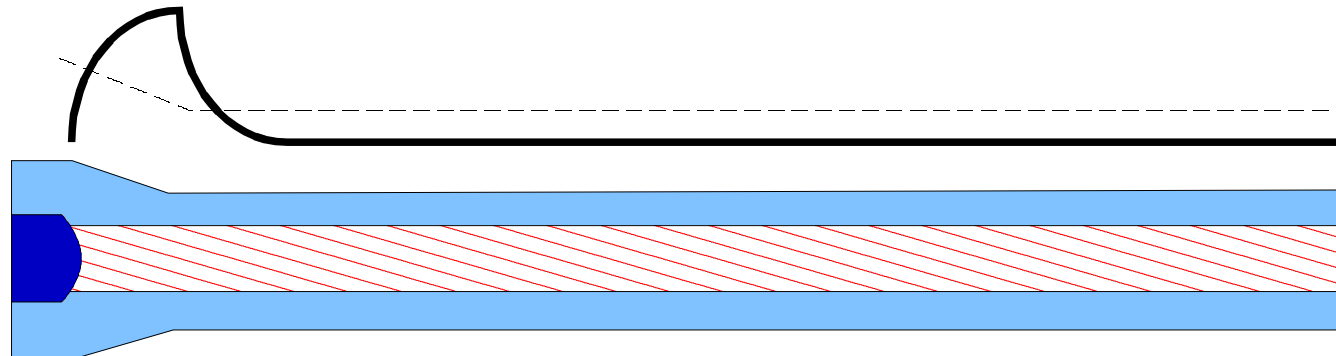
DESIRABLE PRESSURE-TRAVEL CURVE

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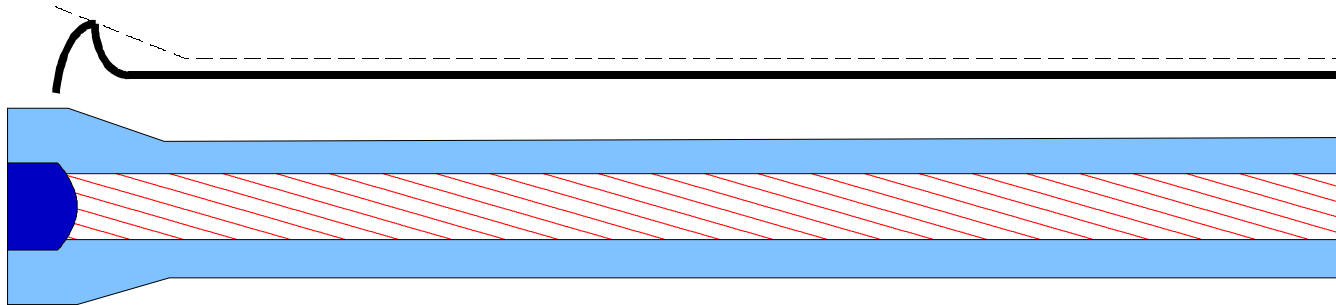
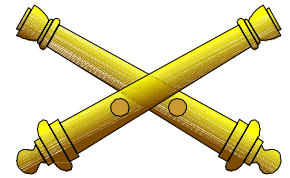
DESIRABLE PRESSURE-TRAVEL CURVE



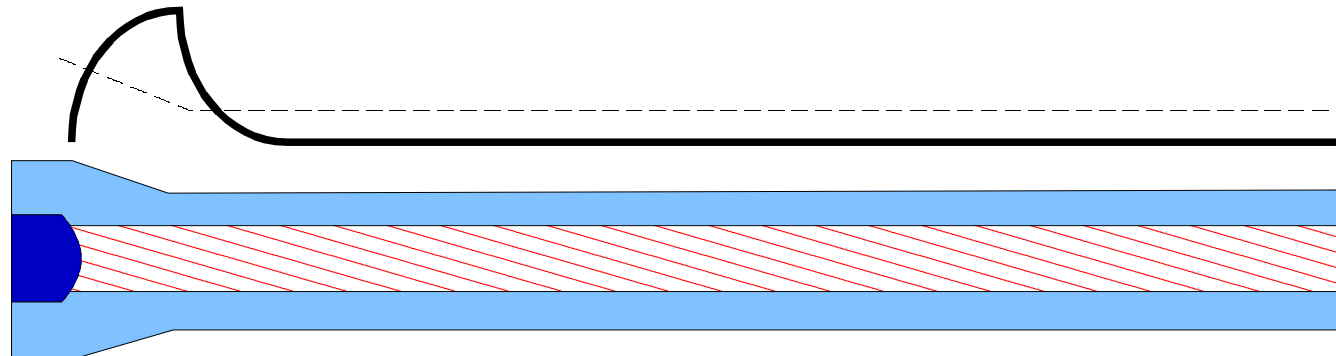
**UNDESIRABLE PRESSURE-TRAVEL CURVE
(INITIAL EXCESSIVE PRESSURE)**

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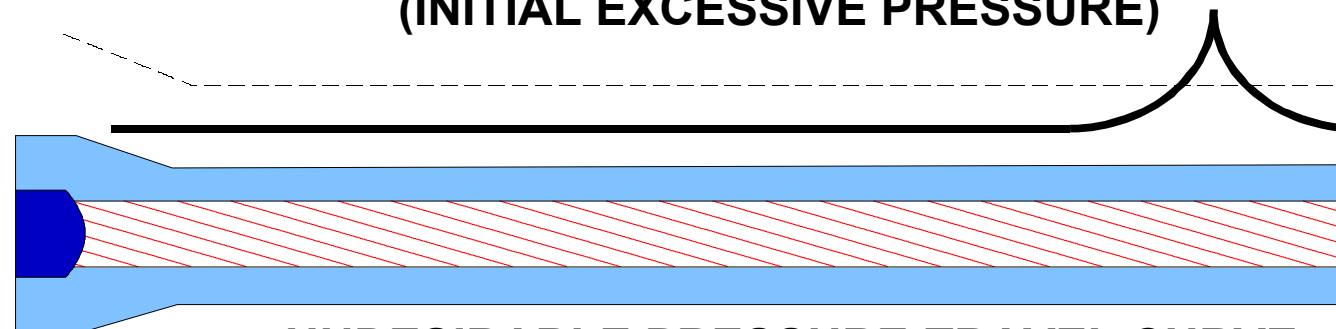
GUNNERY DEPARTMENT



DESIRABLE PRESSURE-TRAVEL CURVE

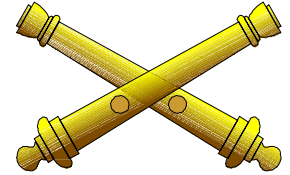


**UNDESIRABLE PRESSURE-TRAVEL CURVE
(INITIAL EXCESSIVE PRESSURE)**



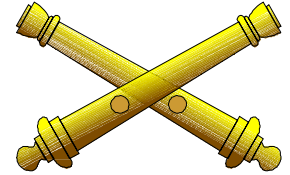
**UNDESIRABLE PRESSURE-TRAVEL CURVE
(DELAYED EXCESSIVE PRESSURE)**

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FACTORS AFFECTING MUZZLE VELOCITY

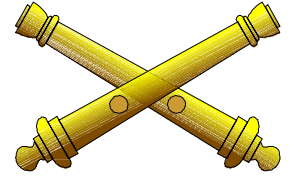
- **VELOCITY TRENDS**
- **AMMUNITION LOTS**
- **TOLERANCES IN NEW WEAPONS**
- **TUBE WEAR**
- **NONUNIFORM RAMMING**
- **ROTATING BAND**
- **PROJECTILE/PROPELLANT
TEMPERATURE**



FACTORS AFFECTING MUZZLE VELOCITY

- **MOISTURE CONTENT OF THE PROPELLANT**
- **POSITION OF THE PROPELLANT**
- **PROJECTILE WEIGHT**
- **COPPERING**
- **PROPELLANT RESIDUE**
- **TUBE CONDITIONING**
- **TUBE MEMORY**

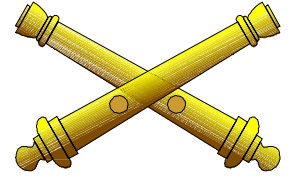
GUNNERY DEPARTMENT



TRANSITIONAL BALLISTICS

**THE STUDY OF THE TRANSITION FROM
INTERIOR BALLISTICS TO EXTERIOR
BALLISTICS**

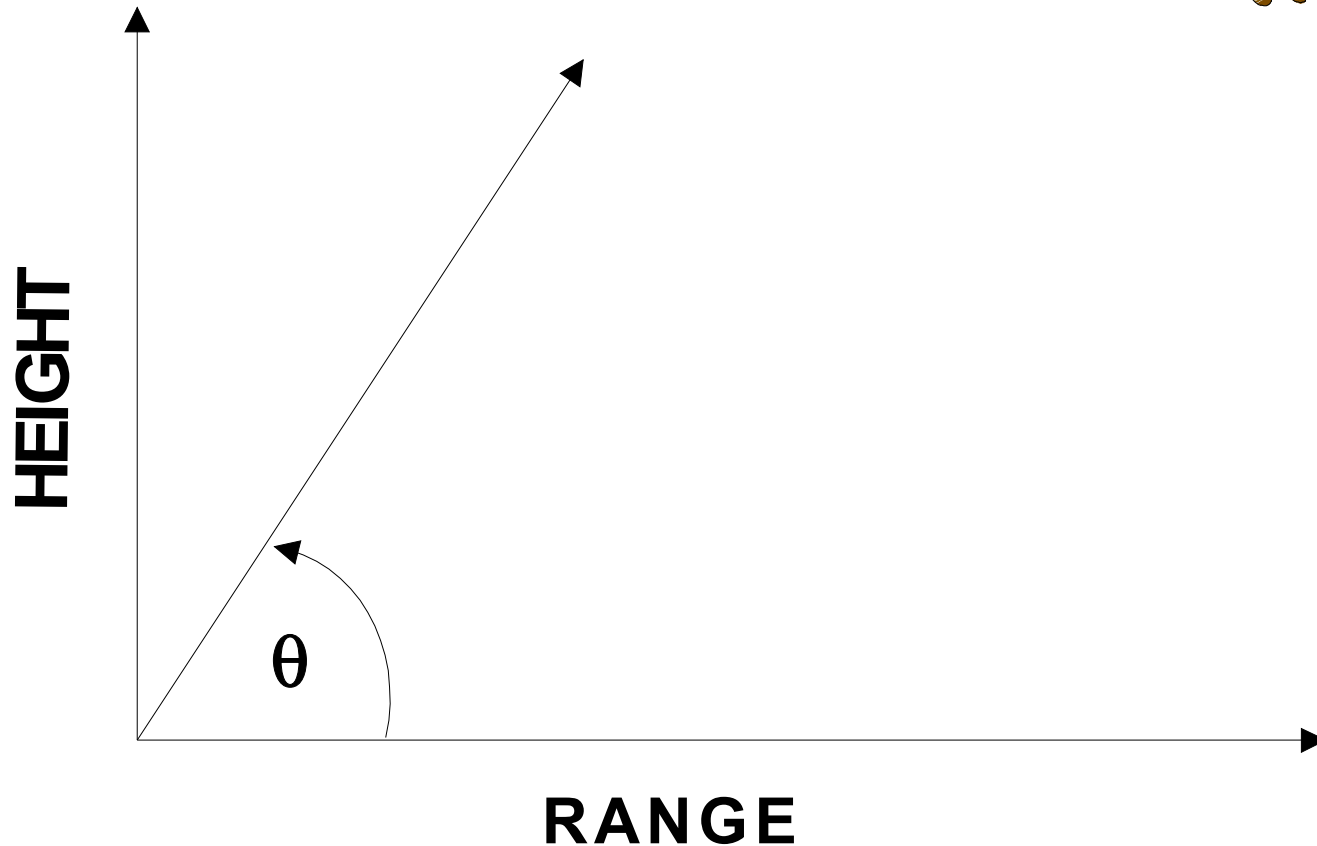
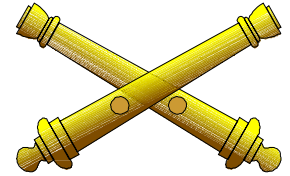
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EXTERIOR BALLISTICS

**THE SCIENCE THAT DEALS WITH THE
FACTORS AFFECTING THE MOTION
OF THE PROJECTILE AFTER IT
LEAVES THE MUZZLE OF THE
WEAPON**

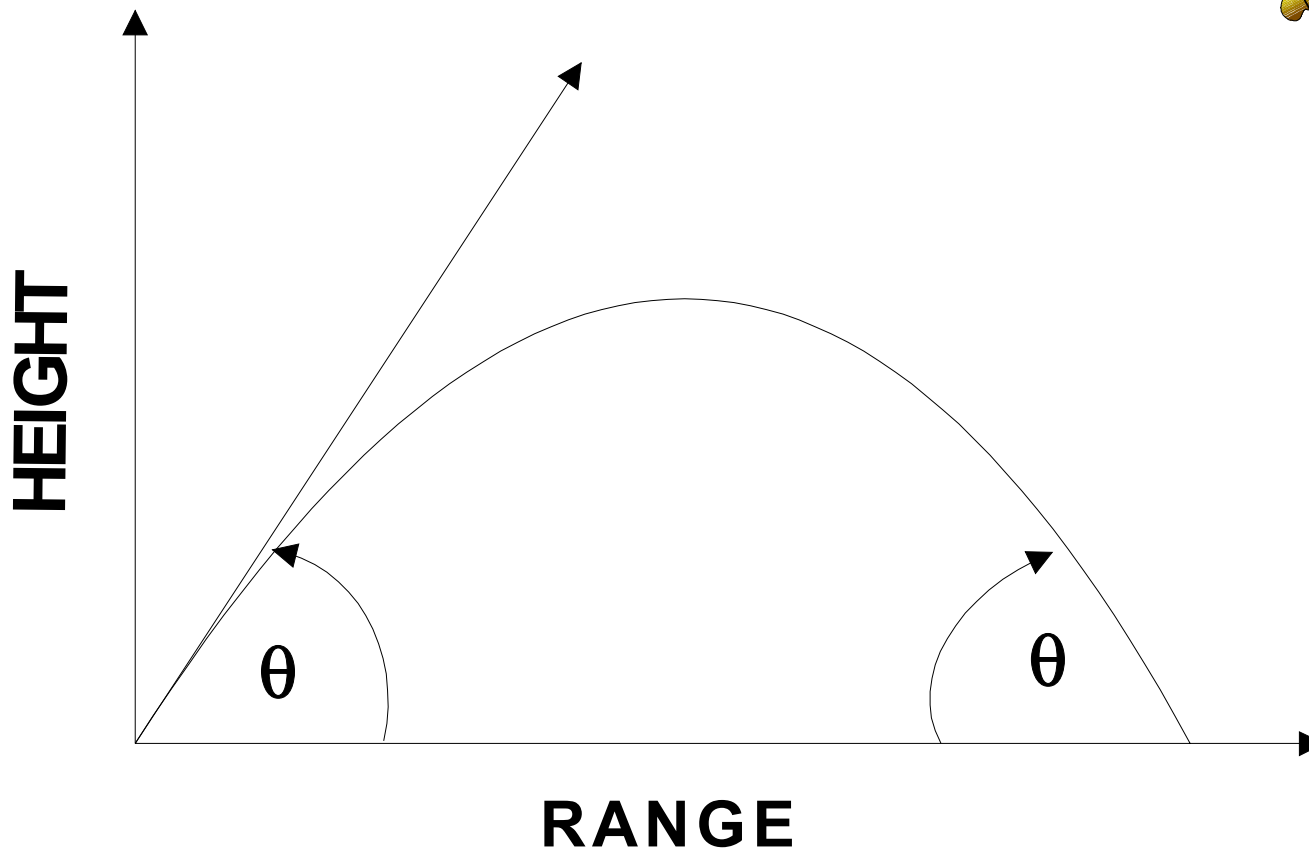
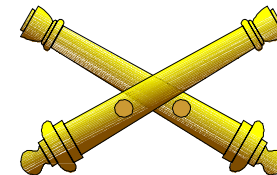
GUNNERY DEPARTMENT



NO EXTERNAL INFLUENCES

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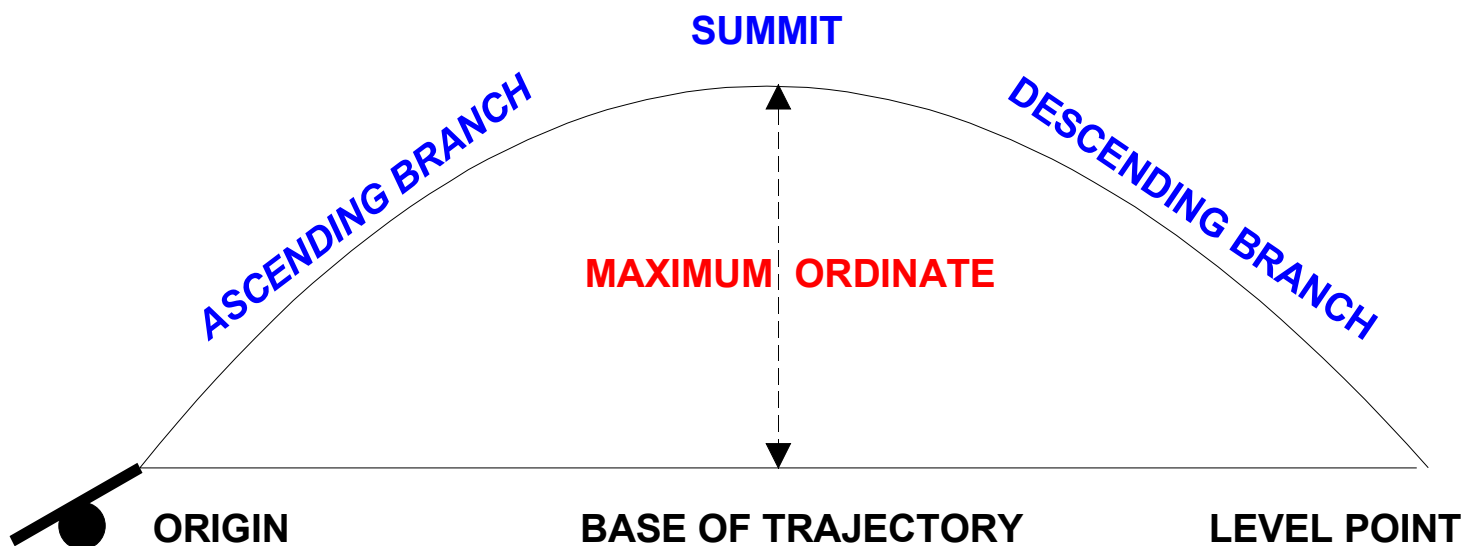
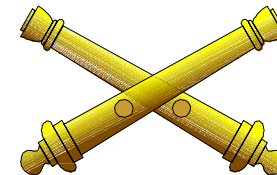
GUNNERY DEPARTMENT



***NO EXTERNAL INFLUENCES
EXCEPT GRAVITY***

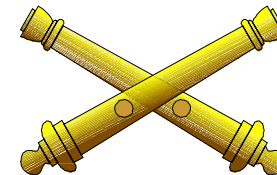
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GUNNERY DEPARTMENT

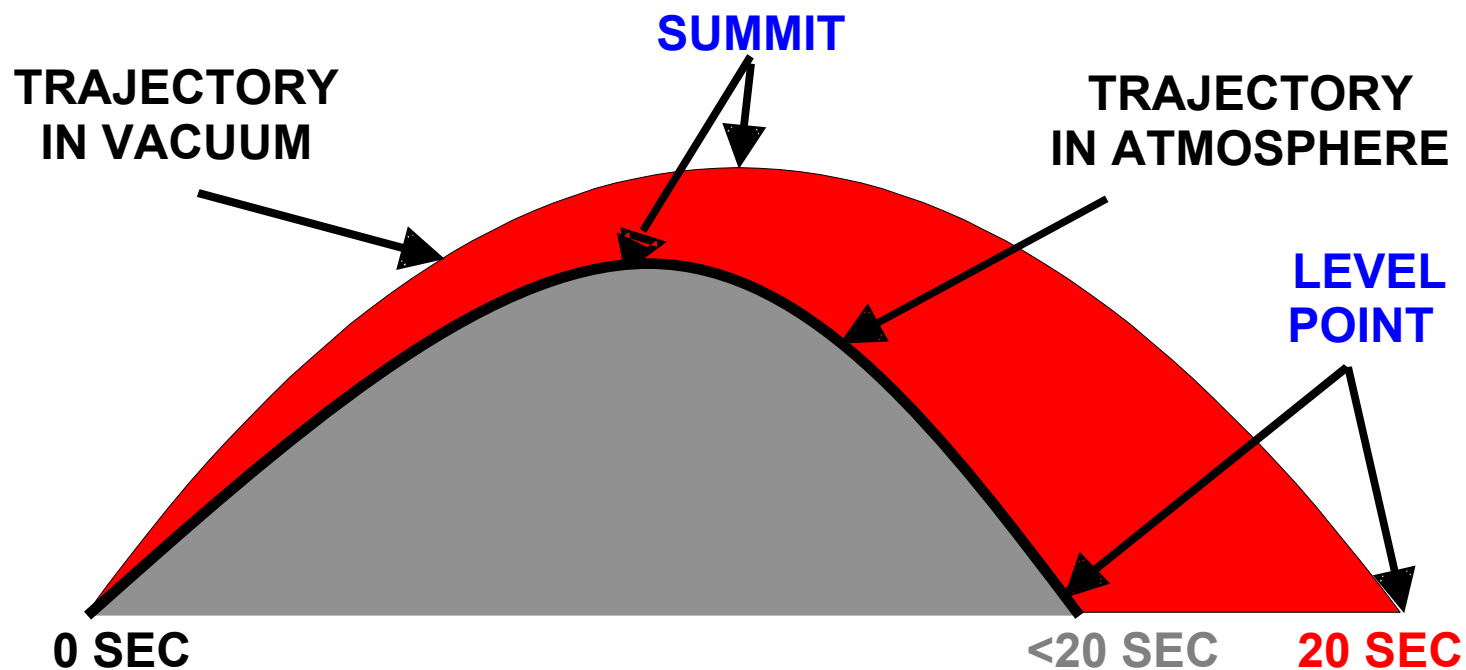


INTRINSIC ELEMENTS OF A TRAJECTORY

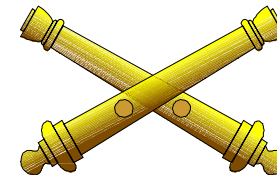
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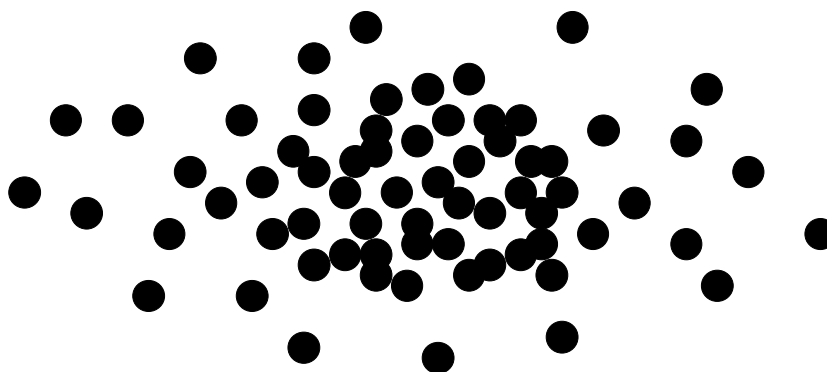
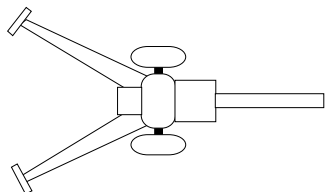
TRAJECTORY IN VACUUM AND TRAJECTORY IN STANDARD ATMOSPHERE



GUNNERY DEPARTMENT



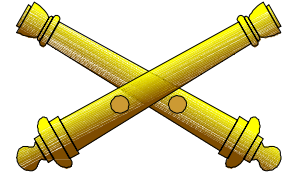
DIRECTION OF FIRE



**ELLIPTICAL DISPERSION PATTERN
CAUSED BY INHERENT ERROR**

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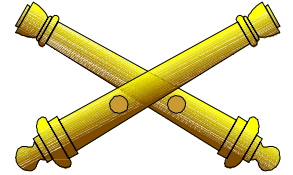
GUNNERY DEPARTMENT



TERMINAL BALLISTICS

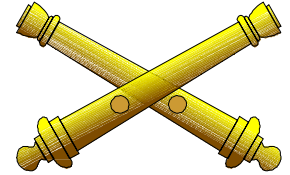
**THE STUDY OF THE EFFECT OF
PROJECTILES ON A TARGET**

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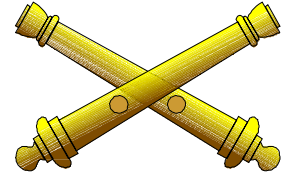
STANDARD TARGET POSTURES USED FOR LETHALITY COMPUTATIONS

- **STANDING**
- **PRONE**
- **CROUCHING IN FOXHOLE**



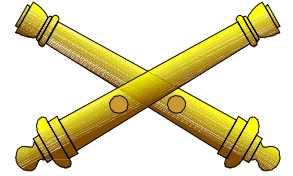
BASIC EFFECTS RULES

- **ICM IS BETTER THAN HE FOR MOST TARGETS**
- **PROXIMITY FUZES ARE BETTER THAN PD FOR TROOPS**
- **PD IS BETTER THAN PROXIMITY FUZES FOR DESTRUCT MISSIONS AGAINST HARD TARGETS AND TARGETS IN A FOREST**
- **1 BATTERY VOLLEY OF HE GIVES < 10% CASUALTIES OF STANDING TROOPS. 1 BATTERY VOLLEY OF ICM GIVES BETWEEN 10% AND 40% CASUALTIES**



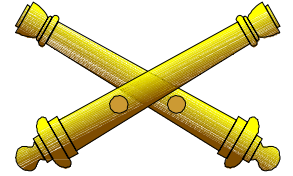
BASIC EFFECTS RULES

- **PRONE TROOPS REQUIRE 1.5 TIMES AS MANY ROUNDS**
- **TROOPS CROUCHING IN FOXHOLES REQUIRE TWELVE TIMES AS MANY ROUNDS**
- **TROOPS IN MARSH GRASS RECEIVE 30% FEWER CASUALTIES THAN THOSE IN OPEN TERRAIN**



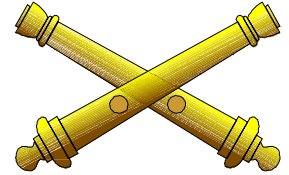
GMET ENTRY ARGUMENTS

- **OFFENSIVE OR DEFENSIVE POSTURE**
- **ADJUST FIRE OR FIRE FOR EFFECT**
- **1 BATTERY OR MASS THE BATTALION**
- **TARGET RADIUS**
- **COMMANDER'S GUIDANCE**



READING THE GMET

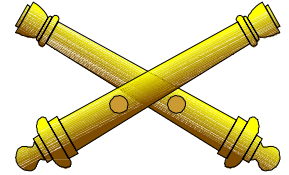
- **ALL LETTERS ARE BAD**
- **BLUE IS BETTER THAN RED**
- **IF TWO NUMBERS ARE THE SAME COLOR, CHOOSE THE SMALLER**



GMET PRACTICAL EXERCISE

- **GIVEN:**
 - ONLY 1 BTRY IS AVAILABLE TO ENGAGE TGT
 - TGT IS OFFENSIVE POSTURE
 - MOVING TGT RADAR (TLE 0) LOCATES TGT AND REQUESTS FFE
 - RADIUS OF TGT IS 150 METERS
 - COMMANDER'S GUIDANCE IS 20% CASUALTIES
- **REQUIREMENT:**
 - WHAT IS THE GMET RECOMMENDED SOLUTION?

4 RNDs, ICM

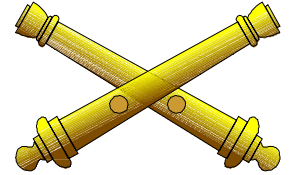


GMET PRACTICAL EXERCISE

- **GIVEN:**
 - YOU WILL MASS THE BN
 - TGT IS ATTACKING
 - AERIAL OBSERVER (TLE 150) REQUESTS FFE
 - TGT IS INF SQUAD I/O (RT IS 50 METERS)
 - COMMANDER'S GUIDANCE IS 10% CASUALTIES
- **REQUIREMENT:**
 - WHAT IS THE GMET RECOMMENDED SOLUTION?

3 RNDs, VT

GUNNERY DEPARTMENT



THE KING OF BATTLE

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